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ABSTRACT

Apache Junction Unified School District, Arizona, has embarked on an 5-year program of instructional improvement using technology. PLATO Elementary reading and mathematics products were installed in the district's four elementary and two middle schools at the beginning of the 1999-2000 school year. This evaluation studied the use and preliminary student outcomes for these PLATO programs: (1) Beginning Reading for the Real World; (2) Projects for the Real World; and (3) Math Expeditions. The study focused on the use of the PLATO products as part of a 4-week summer program targeted at those who were below grade level expectations in reading and mathematics. In classes for grades K through 6, approximately 100 students attended at each elementary school and 75 students attended the middle schools. Complete data were available for 15 to 20 students at each grade. The typical student used PLATO products about 25 minutes each day. All of the third grade students scores as at or above the highest third grade pretest scores, and analyses for first, second, and fourth grades showed a generally positive correlation between the level of program PLATO use and posttest student achievement scores. Students who used PLATO the most progressed the most. Overall, the 3 teachers interviewed for the evaluation and the 74 teachers who completed survey forms were very pleased with the PLATO Elementary products, although their comments do point out some problem areas. An appendix contains the teacher survey and responses. (Contains 17 figures and 6 tables.) (SLD)

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Evaluation Series

Grades 1-8, Apache Junction Unified School District 43, Apache Junction, Arizona

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Executive Summary

Apache Junction Unified School District has embarked on an ambitious five-year program of instructional improvement using technology. PLATO Elementary reading and math products were installed in the district's four elementary and two middle schools at the beginning of the 1999-2000 school year.

The district went through a rigorous selection process before purchasing the PLATO Elementary products. PLATO training has been provided to teachers in the schools over the last two years; the training program is ongoing. As part of the installation, Apache Junction has identified technology support personnel both at the district level and within each school. Teachers use the program as part of their regular classroom instruction.

This evaluation describes the use and preliminary student outcomes from PLATO programs *Beginning Reading for the Real World, Projects for the Real World,* and *Math Expeditions*. The study focused on the use of the PLATO products as part of a four-week summer program targeted to help who were below grade level expectations in reading and math. Classes were offered in grades K to 6; approximately 100 students attended each elementary school and 75 students attended the middle schools. The summer program involved a total of 64 classroom hours of testing and instruction. This study was able to collect research data from four of the summer school classes—a first, second, third, and fourth grade class.

During the summer program the typical student used PLATO Elementary programs for a little less than six hours over the course of the entire program; this would be about twenty-five minutes per day. Students in fourth grade spent somewhat less time on the PLATO Elementary programs than students in first, second, or third grades. The number of PLATO Elementary activities mastered ranged from about ten activities in the first grade to over 35 activities in the fourth grade, more than tripling from first to fourth grade.

An analysis of pretest-posttest scores in the third grade summer school class showed a significant and large change in both reading and mathematics achievement. The third-grade data showed that *all* of the students scored as at or above the highest third-grade pretest score. Additional analysis for first grade, second grade, and fourth grade classes showed a generally positive correlation between the level of PLATO program use and posttest student achievement scores: students who used PLATO the most progressed the most.

Overall the educators responding for the evaluation were very pleased with the PLATO Elementary products. Results of the educator interviews and surveys point out that the positive aspects of PLATO Elementary for Apache Junction were: screen design, lesson content, and teacher training. Results also disclose five problematic issues that are indicated elsewhere: Software bugs and problems, students being confused or trapped in the program, and teacher frustration, especially in terms of lack of computer access and the resulting complexity of running student "groups". Teachers and district administrators

provided details of how the PLATO Elementary program was used. They also identified many program strengths as well as specific suggestions for improving its design and implementation.

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Apache Junction Unified School District 43

Introduction

Apache Junction Unified School District is an organization determined to improve education following a multi-year plan. As a part of that plan, they have been working for five years to make technology a meaningful part of their educational environment. PLATO Elementary[1] was chosen after careful study of several programs, on the basis of its service-orientation, overall instructional capabilities, and cost. PLATO Elementary was installed in all elementary and middle schools at the beginning of the 1999-2000 school year. The first year was a learning effort for all, and the second year was more rigorous.

This report is a study of a reading and math remedial summer school program for grades 1 through 8, conducted in Apache Junction during June of 2001. Classes were held in all elementary and middle schools, and with most teachers using PLATO Elementary. This program and time period were chosen as the focus of this evaluation.

The following report first describes Apache Junction District—their interest in technology, the process they used in choosing PLATO Elementary, the support they have provided for PLATO Elementary, and teacher preparation for technology. This report then describes the summer school program in terms of program design, student placement in PLATO Elementary, student computer use, and the monitoring of student computer use.

Secondly in this report, the "Data" section describes the various evaluation activities and their results as follows:

Student Use Data and Outcome Findings
Instructor Interviews—Telephone interviews with three teachers
Instructor's PLATO Elementary Evaluation—Written evaluations from three schools

Thirdly, the Conclusions section discusses the findings and relates them whenever possible to the overall picture of this PLATO application. The appendix following the report gives transcribed comments.

Program Description

The District. Apache Junction, Arizona is located 30 miles east of Phoenix and Mesa, in the same type of desert landscape. The district has four elementary schools, two middle schools, and one high school (which is not a focus of this report).

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[1] During the time period of this study, Wasatch Interactive, Inc. was acquired by PLATO Learning, Inc. For clarity, all references to Wasatch in this report have been changed to PLATO Primary. *–ed.*

Elementary Schools:

Desert Vista	Gold Canyon
Four Peaks	Superstition Mountain

Middle Schools:

Desert Shadows	Thunder Mountain

Regular elementary school enrollment in the district is approximately 2,450; building enrollments range from 550 to 730. The number of teachers ranges from 33 to 35, for an average teacher-student ratio of 1 to 17-21. District middle school enrollment is about 1,300; about 650 for each of the two schools. Like the elementary schools there are 32 to 35 teachers in each middle school and a ratio of one teacher for every 19 or 20 students.

In all Apache Junction schools, the majority of students is white. Hispanic students comprise 10% to 12% of all but one school; Superstition Mountain Elementary has 18% Hispanic students. In all of the schools, approximately 1% of school populations are American Indian, Asian, or Black. By locality, one middle school and two elementary schools are classified as Urban Fringe of Large City; likewise, one middle school and two elementary schools are classified as Rural, inside Standard Metropolitan Area.

Technology in the District. Apache Junction School District has focused on technology in the last few years. Ms. Sharon Smith, Director of Curriculum, reported: "We've been recognized as one of six innovative school districts in the nation in our use of technology." For the past five years, the district has been following its multi-year plan for implementing technology, which is part of the district's overall achievement plan. Ms. Smith reports that they have worked to lay the foundation for technology use by installing cables within schools and fiber optic lines between schools, and hiring technology support people.

Sharon Smith further explains: "Our long-term technology plan includes the development of a technology-based student management system, curriculum and instruction presented through technology, test item banks linked to the curriculum, and personal wireless input devices for students and teachers...The Federal *e-rate* money and Arizona Technology Literacy Challenge grants have been instrumental in helping us implement these changes...As an incentive to achieve higher learning, Arizona has adopted Proposition 301, which provides more money to districts for higher student achievement."

As Apache District has pursued its multi-step approach, it has started with one or two schools and will finish wiring for the fourth and final elementary school, Four Peaks Elementary, this fall. Currently, three elementary schools have a lab and the one depends upon clusters of 4-6 classroom computers and rotation schedules. Classrooms typically have had from four to seven computers. Teachers who have had inadequate wiring or other hardware problems in their classrooms have not been able to use all of the computers they have had. Upgrades were required at the beginning of the summer session in order to accommodate the Shockwave program.

Software Selection. Software selection for the district involved staff, teachers, and students. A teacher committee with representation from all elementary and middle schools was formed to identify criteria for software selection. Sharon Smith invited vendors of interest to set up a system in one of the elementary or middle schools, and teachers and students were asked to use them while the selection committee observed. The practice users were also asked to evaluate their experience with each program.

> Once the demonstrations were completed for all systems, the committee came together to complete ratings of each software program. A big issue in evaluating the systems was how service-oriented the people who developed and presented and supported the systems were. Systems that were developed by teachers, most particularly the PLATO Elementary system, were rated most highly in this area. The total points were computed for each system. Vendors were asked to submit a bid for implementing their systems in our district. The committee then gave a proposal to the board recommending which system to adopt based upon the point assessment and the dollar value of the bids. The PLATO system was the highest rated system of those reviewed and they also presented the lowest bid.—Sharon Smith

Support of PLATO. The Curriculum Director is happy with district progress in providing technology support to the schools. She says, "We have an extensive system of technology support in our district. Each building has a technology support person. The district has three floating technology support persons, each of whom is assigned to support two buildings. The district also has a technology support group available to all buildings."

She stated, "If a teacher or administrator has a problem with technology they use an online reporting system to report the problem and request service…Every 20 minutes or less a technology staff member scans for any problem reports and makes an assignment to the school technology person, the floating technology person, or a district support person to resolve the problem. This means that within 20 minutes teachers receive a response and are told who will be resolving their problem and when the problem will be resolved."

"Service from PLATO Learning is A+. They get back to me immediately whenever I have a question."

Teacher Preparation. Director Smith said that more teachers in Apache Junction have begun to use technology over the past five years. Competency in technology use is a component of their annual teacher evaluation; it is rewarded by being part of the teacher merit pay system. Teachers in the district are required to demonstrate proficiency in using both the computerized test item bank and the PLATO system.

Initial PLATO Elementary training was given during the first year of PLATO Elementary implementation—1999 to 2000. There were three four-hour sessions throughout the year for basic training. Teachers who worked in the summer school for 2000 were given a few more hours of training.

A large majority of summer school teachers said that they were adequately trained on PLATO Elementary, but in interviews it was noted that only one person could be trained at a time, per grade level. That system, combined with a schedule that stretched training sessions over several months, led to some frustration for some teachers. Another interviewee said that there were also other local training opportunities for those who were interested, but that she preferred to learn it on her own. She also said that she likes using student reports. "Not everyone likes them; I figured out how to use them on my own so I really like them."

From the district's viewpoint, teachers are responsible for integrating the PLATO instruction into their overall curriculum throughout the year, and during the school year they had grade-level meetings in order to plan for that coordination. Individual teachers decide whether students can test out of activities. During the summer school program, most teachers focused on providing remediation of specific skills and therefore were less concerned about the regular curriculum. They were guided by the program purpose to develop deficient skills and demonstrate mastery on relevant PLATO activities. It seems that most teachers used PLATO as supplementary to instruction, especially application and practice.

As district policy, teachers are expected to preview all PLATO lessons before assigning them to students, so that they are familiar with the instruction presented. During class time, teachers assign learning activities, monitor student progress on the activities, and troubleshoot any problems.

Program Design. Apache Junction held summer school from June 4 to June 28, 2001 for students who were below grade level expectations in reading and math. All middle and elementary schools offered the program; approximately 100 students attended each elementary school and 75 students attended the middle schools. Students were chosen to attend summer school according to scores on district or state criterion-referenced tests, other school performance, and teacher recommendations. In each elementary, the program was conducted by the principal and one teacher from each grade level; about four teachers taught at each middle school. The program was held for four weeks, beginning in June. The district required teachers to run student reports, develop lesson plans, and submit them regularly. Classes were held for four hours, 7:30 to 11:30 a.m., Monday through Thursday; the total program time was 16 days, or 64 hours.

Student Placement in PLATO. Every year students are given either the state AIMS test or a district version of it that is generated from a computerized test item bank and matched to district and state goals and objectives. State tests are given in the third, sixth, eighth, and tenth grades; district tests are given in the remaining, or "off-test" grades. These criterion-referenced tests determine district success. They are also used for

decision-making, such as student selection for the summer school program and assignment to PLATO activities. Students were also assigned PLATO activities on the basis of teacher recommendations from the former school year and, in some cases, according to results of a classroom pre-test.

Student Computer Use. For the school year, the district has set a minimum level of use at 2 ½ hours per week; there is no maximum. During summer school, teacher responses indicate that classes had regular blocks of time on PLATO, either in a lab or in classrooms. The amount of time was determined in large part by the accessibility of computers and lack of hardware/software problems. Most students apparently worked alone. One interviewed teacher said that students could not work together because they all had to be able to log on [in order to keep records of student work].

In phone interviews, two teachers said that they encouraged students by verbally praising their efforts and by giving extrinsic rewards; one gave food and one gave little prizes. The third said she did not reward behavior, because her class met in a computer lab and with another adult to help monitor student work it was apparently not required.

Computer work presents its own student management challenges. In her lab, one teacher commented, the lack of help from someone else was a little frustrating. Classroom computer configurations were problematic in more ways. When all students could not use the computers at one time, they were divided into groups, and teachers bounced between students on computers and those doing various activities. Some made comments on evaluation forms about their frustration. In such a setting, students could not be monitored as closely in their computer use as teachers would have liked. At the beginning of summer school, many students did not know how to log on and off properly, so computers froze or would not allow students into the system the following day. Primary grade students, in particular, had difficulty because of reading levels required of them, especially since they were below grade level. (One first grade teacher did not have working sound systems on four of six of her computers and she felt they didn't learn as much as they might have.) Toward the end of the summer school, older students were found shifting quickly between screens so that they could send e-mail.

One teacher benefited during computer use time from the help of a nurse assigned to a special-needs student in her room. Once the special-needs student learned how to use the mouse "she was good to go", so the nurse helped other students on the computer.

One teacher who was interviewed explained that she assigned students to do activities on pre-requisite skills before putting them into the regular *Math Expeditions* program. Many of her first grade students, who were being prepared for second grade, had not learned such basic concepts as left/right; order words such as first, second, third; and above/below. Students were not able to do the math problems because they did not understand what was being asked of them.

Teachers at all grade levels cited difficulty with navigating through lessons; primary students had trouble with icons, especially if they were "reading" the colors of the

buttons and not the words. One teacher said, "When the 'You are finished, close the window' message comes, they don't know how to go to... It doesn't go automatically to the next part; it would be better if it did."

When asked about reliability, one interviewee said, "This year it was down for one day only. The majority of the time it is okay. They had to upgrade equipment to use Shockwave." However, several written and verbal comments referred to local problems. One responder said, "I found that it was difficult to get through all the proficiencies that we wanted to teach. We were not able to get to any of the probability or geometry concepts at all and could have used a bit more time on fractions. Another week of instruction would have been fruitful, or having technology working from the get-go might have helped in this area."

Monitoring Student Achievement. Teachers monitored their computer-users by walking around and observing them and by checking PLATO reports. Many teachers liked being able to check whether students were having trouble with mastery tests or not spending enough time on activities. Teachers also collected information from other classroom activities, and some used benchmark tests produced from the test item bank.

Teachers who were interviewed said that they used PLATO scores to establish student proficiency on learning standards. They graded students for their performance on other school work.

Learning Materials. Those who were interviewed said that they did not assign PLATO practice papers, using instead resources of their own and from the district. One teacher did not know about the PLATO practice papers. Another one does not use paperwork much, preferring to do verbal class exercises. The third grade teacher used Scholastic last school year because she taught the one phonics class for her grade level in her building; other teachers used Silver Burdett. The math program for her school is an objectives-based program produced by teachers because they felt none of the math series texts satisfied the state standards. They worked together to make folders and changed classes every five weeks.

Data Analysis

PLATO Use and Test Score Findings

During the summer program the typical student used PLATO Elementary programs for a little less than six hours over the course of the entire program. Students in fourth grade spent somewhat less time on the PLATO programs than students in first, second, or third grades. The number of PLATO activities mastered increased from about ten activities in the first grade to over 35 activities in the fourth grade, more than tripling from first to fourth grade.

An analysis of pretest-posttest scores in the third grade summer school class showed a significant and large change in both reading and mathematics achievement. The third-grade data showed that *all* of the students scored as at or above the highest third-grade pretest score. Additional analysis for first grade, second grade, and fourth grade classes showed a generally positive correlation between the level of PLATO Elementary program use and posttest student achievement scores.

Sample. Students in this study used the PLATO Elementary reading and math computer programs as part of Apache Junction's summer school program. The program was offered in both elementary and middle schools to help students better master district and state learning goals.

Data from classes of summer school students were used in the study if they had pre-test and/or post-test scores and PLATO use data. After polling the elementary and middle schools, we identified four classes that had both post achievement scores and PLATO system use data. One of these classes had both pretest and posttest data. A total of 71 students were identified from the records with pre- and post-test data on scales developed to measure district and state goals at the appropriate grade level. (Many other classes were not used for this part of the evaluation because they had test data but no computer record of PLATO Elementary system use, or visa versa.)

Table 1. Students and Data by Grade Level

Grade Level	Number of Students	Pretests	Posttests	System Data
1st Grade	20	no	yes	yes
2nd Grade	19	no	yes	yes
3rd Grade	17	yes	yes	yes
4th Grade	15	no	yes	yes

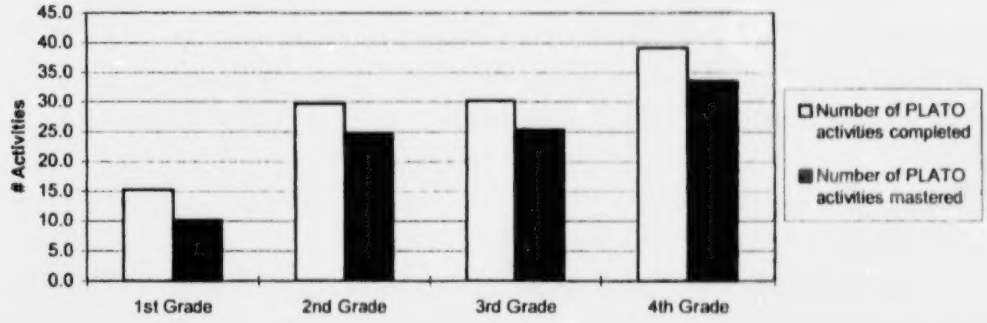
PLATO Use Data. The study classes had student-level printouts giving student use data for the PLATO Elementary programs. The PLATO system data included:

- Number of PLATO activities completed
- Number of activities mastered (activity scores of 80% to 100% correct)
- Average score for all activities completed
- Total minutes of PLATO activity engaged time

This data does not include PLATO activities, if any, that students may have studied earlier in the school year. Nor does it assure that PLATO activities studied were necessarily related only to the pre- and post-test scores available.

The average number of activities completed by the four classes during the summer school program ranged from a low of 15.3 to a high of 39.1 activities; mastered activities ranged from 10.3 to 33.5. The average number of activities completed and mastered increased from first grade through fourth grade. Activities completed more than doubled from 15 to 39; activities mastered tripled from 10 to over 35.

Figure 1. PLATO Primary Activities Completed & Mastered



The average number of correct answers in PLATO activities completed ranged from 80% to 91% correct. Total time engaged in learning on PLATO across the four classes ranged from just under five hours to just over six hours. Unlike the other use indicators, engaged time did not increase from the first grade to the fourth grade; in fact, it decreased an average of an hour and forty-five minutes from third grade to fourth grade. Table 2 shows the averages for PLATO use data across the four grades in the study.

Table 2. PLATO Elementary Use Data by Grade Level

Grade Level	Number of PLATO Activities Completed	Number of PLATO Activities Mastered	Average PLATO Activity Score	Total Min. on PLATO Activities
1st Grade	15.3	10.3	80%	374
2nd Grade	29.8	24.6	88%	331
3rd Grade	30.2	25.4	91%	374
4th Grade	39.1	33.5	89%	287

Tests. Locally developed reading, language arts, and mathematics tests were used in the study. The tests were developed at each school from a database of test items linked to the district and state learning objectives. The tests were different at each grade level and were designed to measure the specific reading, language arts, and mathematics objectives which the students needed the most to learn at that grade level. The number of measures used depended upon the needs in each school and class.

Scale scores are reported in terms of percentage of items correct. All four grade levels have relatively high percents correct on reading and mathematics posttest scores (see Figure 2). The third grade class has substantially higher posttest scores than pretest scores (see Table 3).

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Figure 2. Posttest Reading & Math Scores

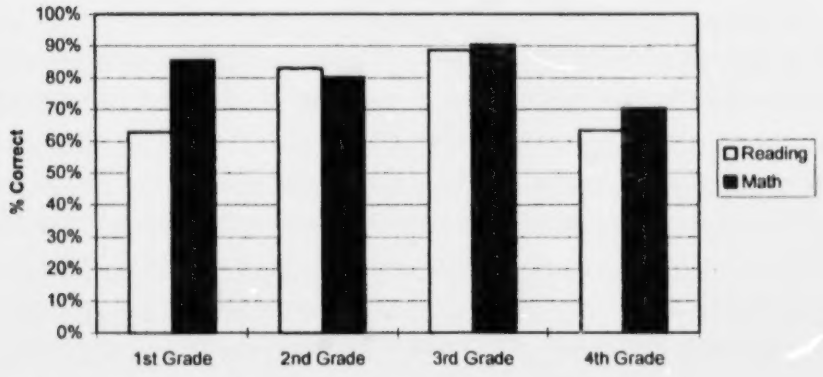

Table 3. Achievement Test Percent Correct by Grade Level

Grade Level	Pre-Reading	Pre-Math	Post-Reading	Post-Math	Post-Lang. Arts
1st Grade	(na)	(na)	63%	86%	(na)
2nd Grade	(na)	(na)	83%	80%	69%
3rd Grade	63%	65%	89%	90%	(na)
4th Grade	(na)	(na)	63%	70%	(na)

Grade 3 Pre- and Post- Scores. When the third grade reading and math test scores were compared from the pre-test to the post-test, statistically significant gains were found for both measures. The mean reading pre-test score was 61 percent correct; the mean posttest reading score was 89 percent correct. This is an average reading gain of 27 percent from pre to post. One common way of judging how meaningful such gain scores might be is to use the average standard deviation of the pre- and post-scores as a measuring stick. Doing this we find that the mean reading gain of 27 percentage points is over two (2.16) standard deviations in size..

The mean math pre-test score was 65 percent correct; the mean posttest math score was 90 percent correct. This is an average math gain of 25 percent from pre to post. The math test gain was 27 percentage points and is over three (3.13) standard deviations in size.

Gains of over two standard deviations are usually considered very large and educationally meaningful. These gains reflect the close linkage between the test items and the PLATO Elementary activity content. The gain reflects achievement on educationally meaningful reading and mathematics content as defined by the district and state objectives. Table 4 provides descriptive statistics for the pre-, post-, and gains on the third grade scores; Figures 4 and 5 shows the pre- and posttest scores for reading and math tests.

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Table 4. Pre-, Post-, and Gains on 3rd Grade Reading and Mathematics Scores

Test		Mean	N	Std. Deviation	Pre-Post Corr.	Post-Pre Difference	Post-Pre *t* test
Reading	Pre	61%	15	13%	.91	27%	17.69
	Post	89%	15	10%			
Mathematics	Pre	65%	15	8%	.95	25%	36.23
	Post	90%	15	8%			

NOTE: Correlation significant at $p < .001$; the *t* tests are significant at $p < .001$

Figure 3. Third Grade Reading Pre-Post Scores

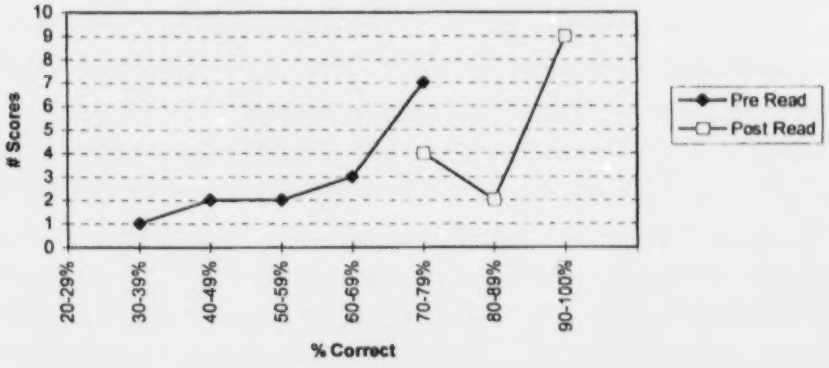
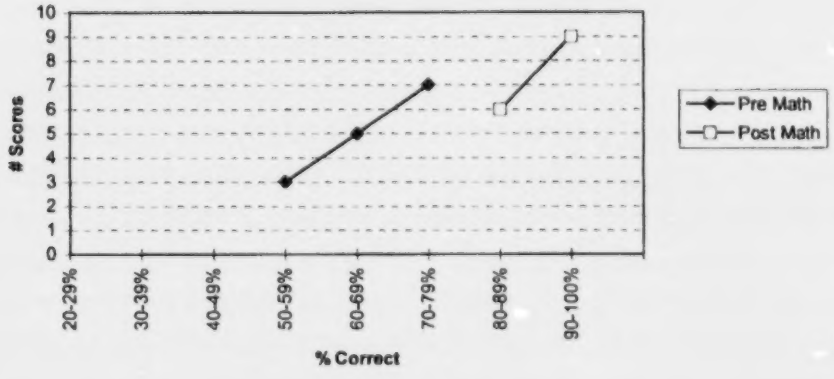


Figure 4. Third Grade Math Pre-Post Scores



Relating PLATO Use to Test Scores. Many factors typically influence the relationship between PLATO use and test scores, such as the way placement and individual prescriptions are done, and the degree to which students are allowed to work at

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their own pace. As a result, the relationship between PLATO use and test scores can often be difficult to interpret. To examine the relationship at Apache Junction, the test scores within each grade level were divided as nearly as possible into two equal-size groups on each of four PLATO use measures. Test scores were then examined for the lower- and higher-use groups at each grade level. With a few exceptions, higher levels of PLATO use were related to nominally higher achievement test scores. This trend for higher scores as related to number of activities completed or mastered is given in Table 5. Of the 36 low/high use comparisons listed, 27 (75%) show higher test scores for the high use groups. When we remove activity percent correct, 25 of the remaining 27 low/high comparisons (93%) show higher test scores for higher use groups. Figures 5 and 6 illustrate this relationship for activities mastered and engaged time.

Table 5. Relationship between Posttests and PLATO Elementary Use

Low/High Use Variable	Grades	Reading		Math		Lang. Art	
		Lower	Higher	Lower	Higher	Lower	Higher
Number of Activities	1st Grade	51%	75%	77%	94%	(na)	(na)
	2nd Grade	77%	89%	73%	88%	59%	80%
	3rd Grade	86%	91%	86%	94%	(na)	(na)
	4th Grade	66%	61%	69%	72%	(na)	(na)
Activities Mastered	1st Grade	55%	74%	80%	94%	(na)	(na)
	2nd Grade	83%	85%	78%	82%	62%	75%
	3rd Grade	85%	91%	85%	94%	(na)	(na)
	4th Grade	68%	58%	64%	78%	(na)	(na)
Activity % Correct	1st Grade	62%	64%	79%	93%	(na)	(na)
	2nd Grade	86%	80%	83%	74%	71%	63%
	3rd Grade	89%	89%	91%	90%	(na)	(na)
	4th Grade	64%	58%	67%	77%	(na)	(na)
Engaged Time	1st Grade	60%	66%	79%	92%	(na)	(na)
	2nd Grade	78%	87%	69%	86%	58%	74%
	3rd Grade	88%	89%	89%	92%	(na)	(na)
	4th Grade	66%	57%	39%	75%	(na)	(na)

Figure 5. Reading Scores by High/Low Use Groups

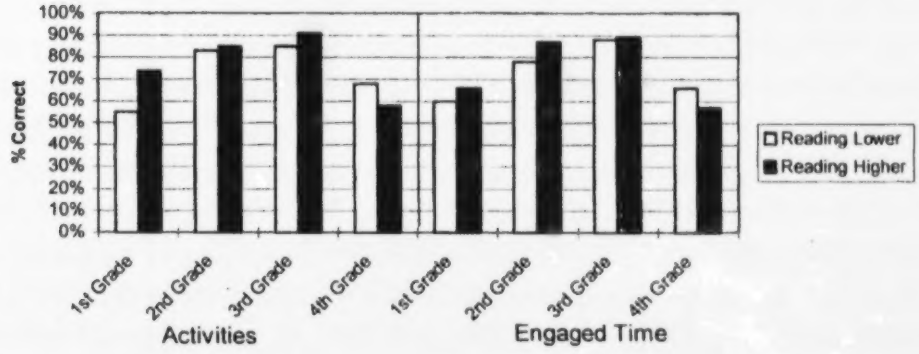
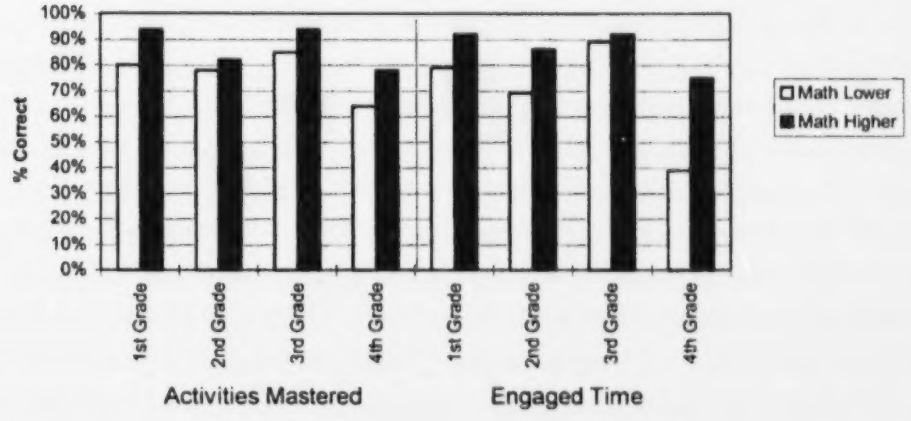


Figure 6. Math Scores by High/Low Use Groups



When the simple correlations between PLATO Elementary use and test scores were examined there were statistically significant correlations for 17 of the 44 pairs of variables (39%). Almost all of the significant correlations were in the first or second grade. When multiple regression is used to look at the multiple correlations between use and test scores there were statistically significant relationships at each grade level between PLATO Elementary use and test scores.

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Table 6. Simple Correlations between Test Scores and PLATO Elementary Use

Grade Level	Test Score	Statistic	Number of PLATO Elementary activities completed	Number of PLATO Elementary activities mastered	Average PLATO Elementary activity score	Total min. on PLATO Elementary activities
First Grade	Posttest reading	Correlation	0.64	0.52	-0.01	0.44
		Sig.	0.00	0.02	0.97	0.05
		N	20	20	20	20
	Posttest math	Correlation	0.34	0.48	0.43	0.61
		Sig.	0.15	0.03	0.06	0.00
		N	20	20	20	20
Second Grade	Posttest reading	Correlation	0.45	0.50	0.12	0.68
		Sig.	0.06	0.03	0.64	0.00
		N	19	19	17	16
	Posttest language arts	Correlation	0.53	0.57	0.12	0.69
		Sig.	0.02	0.01	0.65	0.00
		N	19	19	17	16
	Posttest math	Correlation	0.47	0.52	0.17	0.62
		Sig.	0.04	0.02	0.50	0.01
		N	19	19	17	16
Third Grade	Pretest reading	Correlation	-0.08	-0.05	0.06	-0.16
		Sig.	0.77	0.86	0.83	0.55
		N	16	16	16	16
	Posttest reading	Correlation	0.27	0.37	0.14	0.10
		Sig.	0.33	0.18	0.61	0.72
		N	15	15	15	15
	Pretest math	Correlation	0.34	0.43	0.10	0.06
		Sig.	0.20	0.10	0.72	0.83
		N	16	16	16	16
	Posttest math	Correlation	0.42	0.47	0.01	0.22
		Sig.	0.12	0.08	0.97	0.44
		N	15	15	15	15
Fourth Grade	Posttest reading	Correlation	-0.41	-0.43	-0.16	-0.35
		Sig.	0.13	0.11	0.60	0.24
		N	15	15	13	13
	Posttest math	Correlation	0.11	0.18	0.58	0.18
		Sig.	0.69	0.53	0.04	0.57
		N	15	15	13	13

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Table 7. Multiple Regression Correlations between PLATO Elementary Use and Test Scores

Dependent Variable	Model Elements	Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
		B	Std. Error	Beta		
		First Grade				
Posttest Reading $R^2 = .275$	(Constant)	0.058	0.222		0.260	0.798
	Number of PLATO Elementary activities mastered	0.056	0.021	0.524	2.613	0.018
Posttest Math $R^2 = .645$	(Constant)	-0.985	0.388		-2.543	0.021
	Average PLATO Elementary activity score	1.897	0.464	0.569	4.087	0.001
	Total minutes engaged in PLATO Elementary activities	0.001	0.000	0.715	5.139	0.000
		Second Grade				
Posttest Reading $R^2 = .658$	(Constant)	-0.579	0.383		-1.514	0.154
	Average PLATO Elementary activity score	0.994	0.370	0.481	2.685	0.019
	Total minutes engaged in PLATO Elementary activities	0.002	0.000	0.888	4.959	0.000
Posttest Math $R^2 = .596$	(Constant)	-1.894	0.786		-2.410	0.031
	Average PLATO Elementary activity score	1.959	0.760	0.502	2.578	0.023
	Total minutes engaged in PLATO Elementary activities	0.003	0.001	0.836	4.296	0.001
Post Lang. Art $R^2 = .653$	(Constant)	-1.752	0.672		-2.606	0.022
	Average PLATO Elementary activity score	1.691	0.650	0.469	2.601	0.022
	Total minutes engaged in PLATO Elementary activities	0.003	0.001	0.886	4.911	0.000
		Third Grade				
Posttest Reading $R^2 = .876$	(Constant)	0.445	0.049		9.103	0.000
	Pretest reading score	0.639	0.075	0.873	8.481	0.000
	Number of PLATO Elementary activities mastered	0.002	0.001	0.225	2.191	0.049
Posttest Math $R^2 = .986$	(Constant)	-0.444	0.137		-3.243	0.009
	Pretest math score	1.040	0.046	1.067	22.442	0.000
	Number of PLATO Elementary activities completed	0.013	0.002	2.518	7.674	0.000
	Number of PLATO Elementary activities mastered	-0.015	0.002	-2.295	-7.652	0.000
	Average PLATO Elementary activity score	0.736	0.144	0.410	5.118	0.000
		Fourth Grade				
	(Constant)	-0.711	0.605		-1.175	0.265

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Posttest Math $R^2 = .337$	(Constant)	-0.711	0.605		-1.175	0.265
	Average PLATO Elementary activity score	1.611	0.681	0.581	2.365	0.037

Phone Interviews

During the fall of 2001, three elementary school teachers were interviewed by phone, using the *PLATO Instructor Interview Questions*. The teachers—one third grade and two first grade teachers—were from different schools in the district. The responses to these interviews were used in the program description at the beginning of this report and other sections to bring some depth to other comments or data. There is one issue from the interviews that has not previously been discussed and that is presented here.

Was there a regular time within the sequence of a lesson or unit in which your students experienced their PLATO activities?

All three teachers used PLATO as a supplement to their classroom instruction. These respondents did not seem to think in terms of parts of a lesson beyond introductory instruction, application/practice, review, and assessment. When discussing PLATO they framed their use pattern in terms of availability of computers. Especially for the summer school program, all of those who were interviewed spoke about meeting goals for remedial instruction; learning gaps guided what they did with PLATO, as well as the availability of computers. One trip a week to a lab is, by necessity, an occasional experience. Having a few computers in classrooms requires use throughout the school "day", and therefore is more loosely tied to a teacher's lesson.

One teacher said, "We have five computers in my classroom to use on a rotating basis. We also went to the computer lab once a week. I have 20 to 30 students in my class (different grade levels last year and this) and it takes a long time to get them all through the classroom computers. I had students use computers during reading group time, not during reading instruction time."

Another teacher said that she uses PLATO for practice and reinforcement, that students should be taught concepts first and then practice the concepts on the computer. "I do a lot [with computers] during silent reading. Also, those who get done early [with classroom work] get in and work where they left off [on the computer]. I don't assign the next thing until they are done with one assignment [they are working on]."

Instructor's Evaluation

In order to gather information from several teachers who are using PLATO Elementary software in the district, the Instructor's PLATO Evaluation survey was distributed to three schools. (Surveys from two other schools were returned to the evaluators too late for inclusion in the report, but the content of the late surveys are consistent with the findings reported here.) The survey asked 41 questions about teachers' use of PLATO, divided into three sections. Part I had 28 questions about the PLATO Elementary products and their use. Teachers were given a five-point scale of answers, from "Strongly Agree" to "Strongly Disagree." Part II of the survey asked how often teachers gave instructions to students regarding the use of the PLATO system; teachers answered on a

six-point rating scale, from 5 (daily) to 0 (never). Part III of the survey posed seven open-ended questions, to be answered in writing.

The faculty members of two middle schools and one elementary school completed the Instructor's Evaluation. The schools represented were Thunder Mountain Middle School, 19 usable forms returned; Desert Shadows Middle School, 30 usable forms returned; and Four Peaks Elementary School, 24 usable forms returned. The total number analyzed for all three schools was 74. A few respondents wrote a note that they were new in using the program but they nevertheless answered at least Part I of the questions.

Results of this survey point out the positive aspects of PLATO Elementary for Apache Junction teachers were primarily screen design, lesson content, and teacher training. Results also disclose five problematic issues that are indicated elsewhere: Software bugs and problems[2], students being confused or trapped in the program, and teacher frustration, especially in terms of lack of computer access and the resulting complexity of running student "groups".

Comments from the other sources hint that, generally speaking, PLATO Elementary rankings were good when hardware was available and working, PLATO Elementary software worked well, and PLATO Elementary topics were applicable and acceptable to the teacher's subject area. There was also some feeling displayed in the other data sources that computers in general were a different matter than specific software or individual school equipment settings.

PLATO Elementary Content. The first group of questions discussed here asked about the content of PLATO Elementary lessons and their alignment with state, district, and teacher objectives. From one-half to three-fourths of all respondents agreed that content was good. Most positive responses came for content being current (Q. 5), content being good for the topics (Q. 1), and course objectives aligning with the teacher's own (Q. 2). There seemed to be concern over PLATO Elementary alignment with the standard final test (Q. 3) and content being free from errors (Q. 4). The Neutral category included 18% to 29% of the responses. Elementary teachers were slightly more negative than were middle school teachers on most of the items in this cluster. A few first grade teachers wrote comments about issues related to beginning readers who could not benefit from PLATO Elementary lessons or who struggled with the structure of the system, particularly in this remedial program.

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[2] Apparent bugs can be caused by the software or the configuration of the local hardware, operating system or network. No attempt was made in this evaluation to isolate root causes of apparent bugs. Software bugs and errors are corrected in regular maintenance releases, and technical support assists clients with hardware, software and networking issues. *–ed.*

Figure 7. PLATO Content

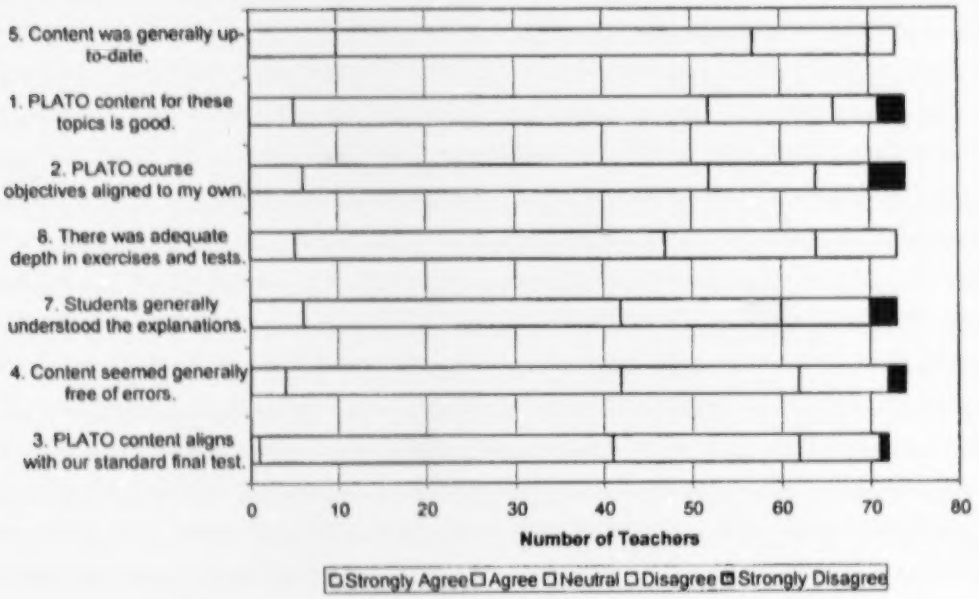
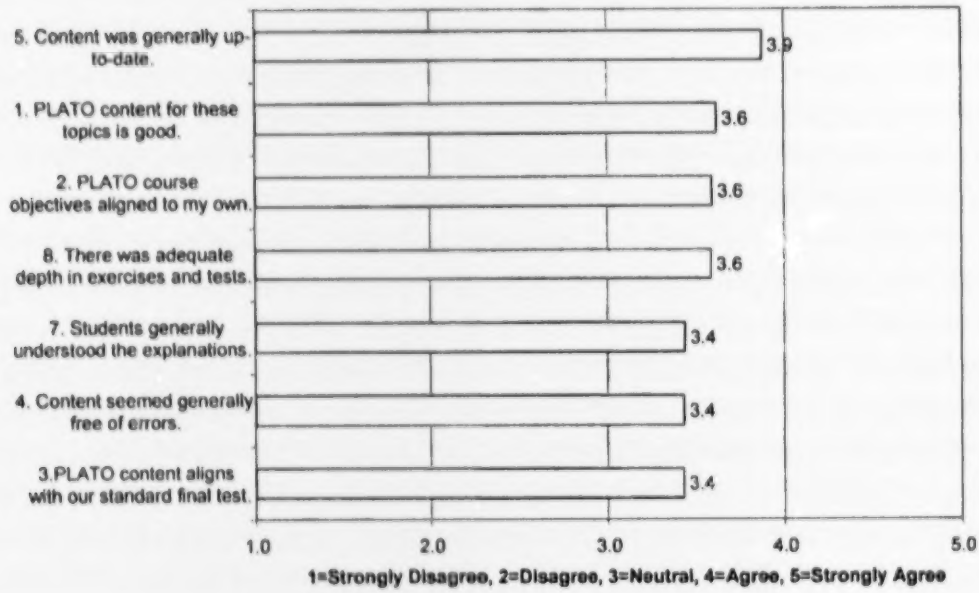


Figure 8. PLATO Content Mean Ratings



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Instructional Design. Approximately three-fourths of the respondents were positive about PLATO Elementary software. Respondents were most positive about the graphics (Q. 14, 84%) color (Q. 13, 84%), and screens (Q. 15, 82%). They were also positive about the style of instruction being consistent (Q. 6, 74%), alignment of lesson parts with Instructor Guides (Q. 9, 72%), consistent use of keystrokes and display style (Q. 12, 70%), and tutorials involving students through interactive style (Q. 10, 68%).

Figure 9. Instructional Design

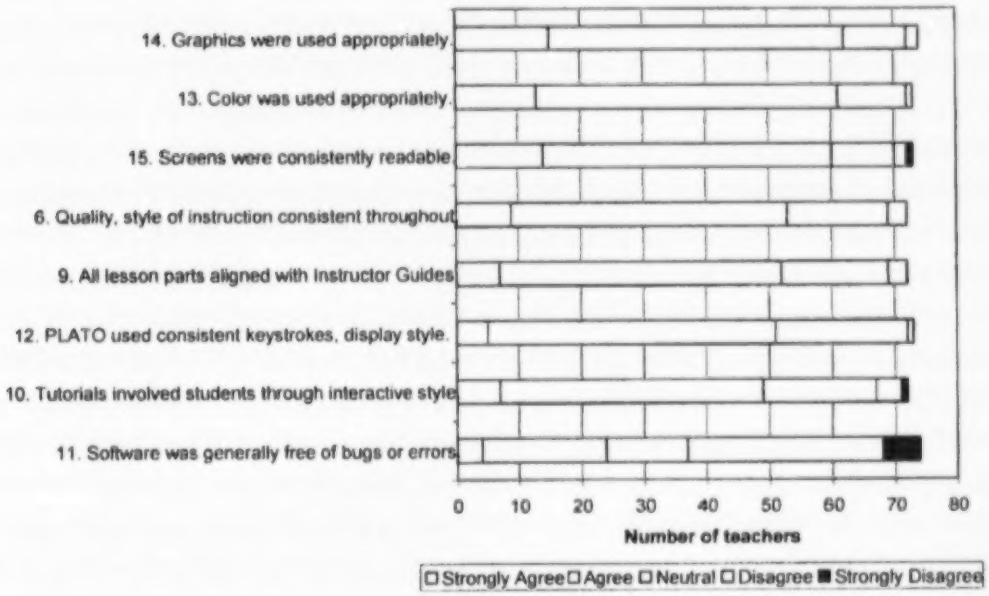

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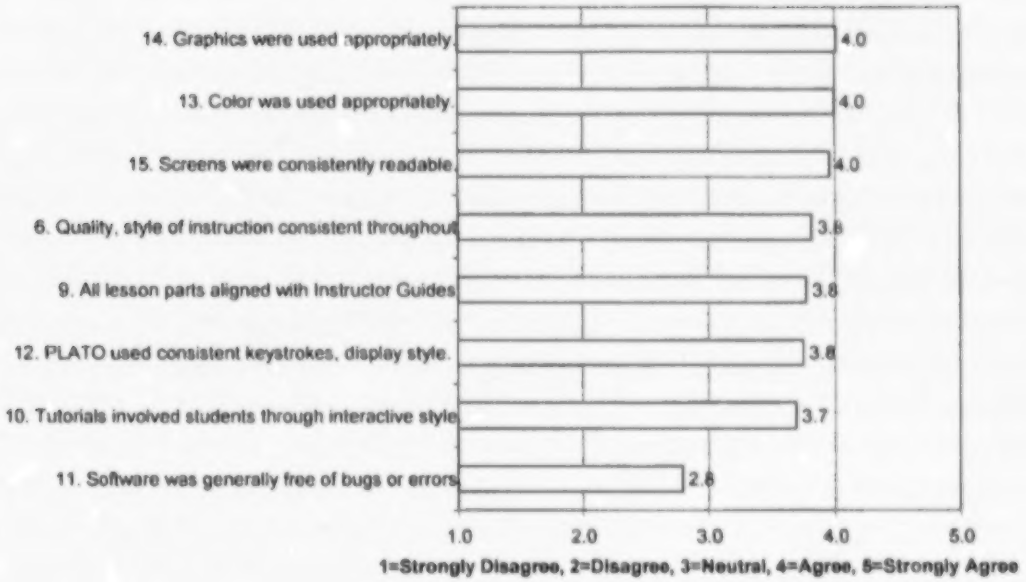
Figure 10. Instructional Design Mean Ratings



Fewer positive ratings were given when educators were asked whether software was generally free of bugs and errors (Q. 11). Only one in three respondents (32%) agreed that PLATO Elementary satisfied that criterion; this was the most negative score in the survey. Fully one-half of the respondents (50%) disagreed that the software was free of bugs or errors, and one in six (18%) were "neutral". Elementary teachers were less positive about tutorials involving students; they were a little more positive about the content being free from errors.

Teacher Experience with PLATO Elementary. Three out of four respondents (Q. 27, 73%) said that they had been adequately trained to use PLATO; elementary teachers were a little more positive about the training. One-half of the respondents were interested in more training (Q. 28, 51%), with middle school teachers being more interested.

Six out of ten teachers (62%) indicated that they could make assignments on the system (Q. 18). Almost one-half of the respondents agreed that they were able to use student progress reports (Q. 16, 46%) and that they were able to relate PLATO Elementary to classroom activities (Q. 20, 46%). Most of the remaining ratings for these two items were "neutral" (39% and 38%, respectively). Phone interviews indicated that student progress reports were used daily by some teachers to monitor student work, but they were used only occasionally by those who relied more upon their own judgment of activities for assigning activities. Low ratings for relating PLATO Elementary with activities, are probably tied somewhat to the atypical situation of summer school. One teacher in a

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phone interview explained that she did not try to tie PLATO Elementary to her usual curriculum because her focus was working to mastery level on specific skills. Also, many teachers may have used classroom activities for other purposes.

Approximately four out of ten teachers said that they enjoyed working with PLATO Elementary (Q. 25, 43%), that PLATO Elementary was useful in teaching (Q. 26, 41%), and that computer work is productive (Q. 24, 38%). The questions that have been grouped for this cluster all received a large percentage of "Neutral" rankings—from 20% to 39%. In fact, some of the rankings were fairly evenly distributed across all categories. Rankings of "Disagree" or "Strongly Disagree" ranged from 7% to 34% of the responses. Most negative of the items was Number 24, which stated that computer work is productive and not frustrating. This was one of the five most negative responses on the survey.

Figure 11. Teacher Experience with PLATO

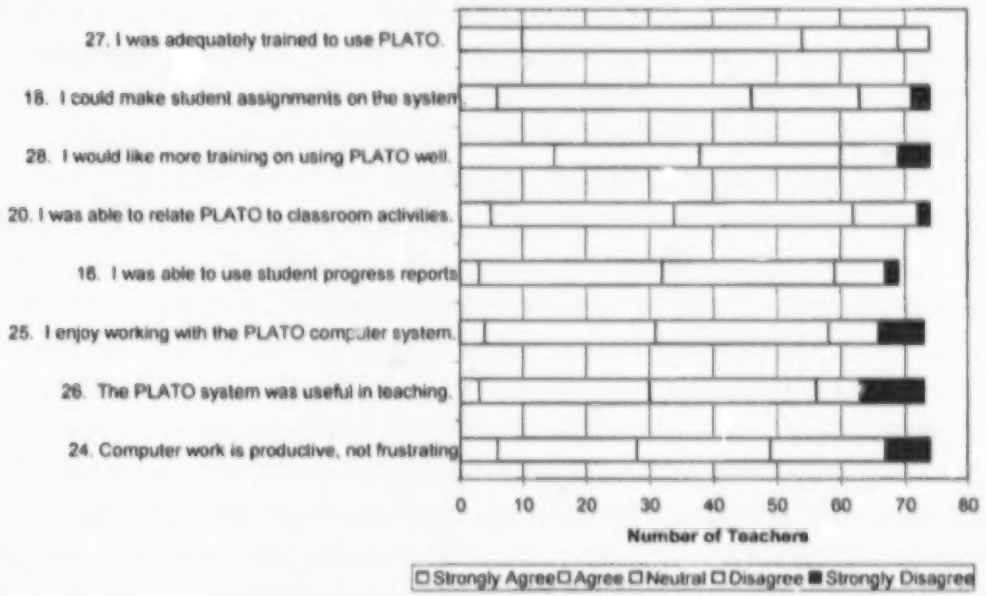

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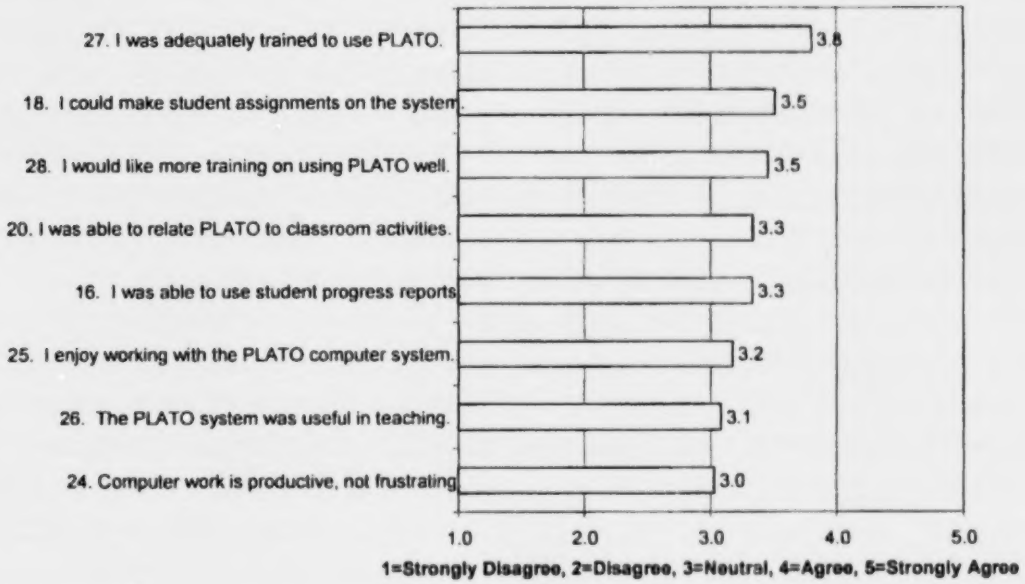
Figure 12. Teacher Experience Mean Ratings


27. I was adequately trained to use PLATO.
3.8
18. I could make student assignments on the system.
3.5
28. I would like more training on using PLATO well.
3.5
20. I was able to relate PLATO to classroom activities.
3.3
16. I was able to use student progress reports.
3.3
25. I enjoy working with the PLATO computer system.
3.2
26. The PLATO system was useful in teaching.
3.1
24. Computer work is productive, not frustrating.
3.0
1.0
2.0
3.0
4.0
5.0
1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

Student Experience with PLATO Elementary. When asked whether students responded well to PLATO Elementary, one-half of the teachers agreed (Q. 23, 49%) and one in six disagreed (18%). Likewise, when asked whether students *in general* responded well to PLATO Elementary, one-half of the teachers agreed (Q. 21, 49%) and one in six disagreed (21%). Elementary teachers were slightly more negative on these two items, no doubt because they had more trouble in general with students getting in and out of the program and understanding the instructions. From phone interviews, it seems that students worked alone on the computers, and so there was no peer assistance.

Only one in four teachers said that they could do tutoring while students used PLATO Elementary (Q. 17, 23%); four in ten disagreed (39%) and a large proportion was neutral (38%). These results are consistent with the description of computer availability and software problems. Teachers were busy helping students with system use, while managing other instructional groups. Linked with this issue is that of some students' difficulty in using the system. In response to the statement that students are *seldom* confused or trapped, only one in five agreed (Q. 22, 19%). One-half of the respondents (49%) disagreed, thus indicating that student use was a serious problem. One-third of the teachers were "neutral" on the issue (32%), because they either did not use the program or use it much, or because they had a mixture of experiences, with students becoming more capable toward the end of summer school.

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Figure 13. Student Experience with PLATO

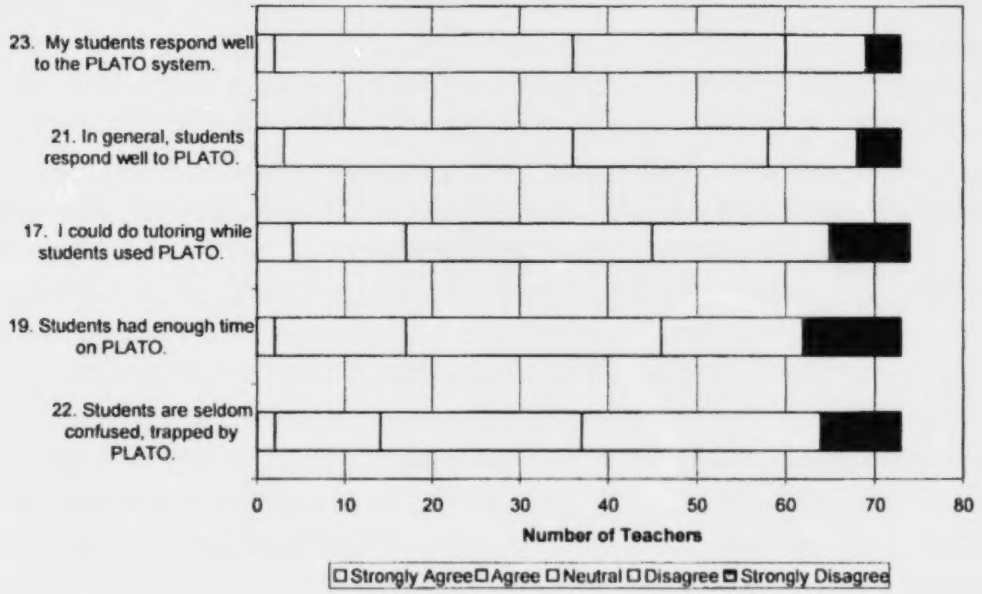
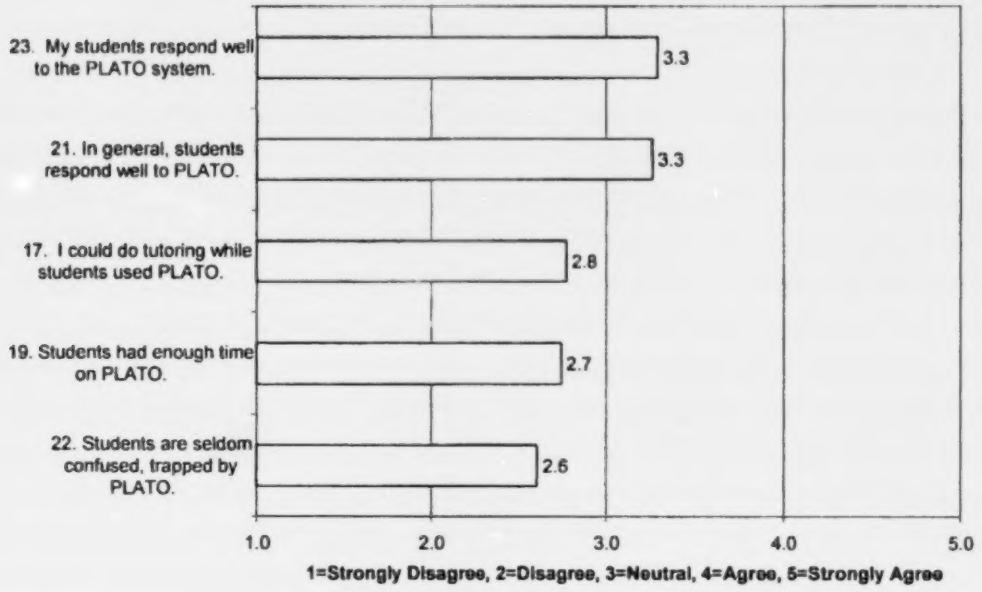


Figure 14. Student Experience Mean Ratings



Frequency of Activities. The second section of the Instructor's PLATO Evaluation asked for ratings of how frequently teachers explained six issues to their students. The

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areas of explanation were: (Q. 29) prerequisites for success with PLATO; (Q. 30) personal experiences related to PLATO assignments; (Q. 31) learning objectives; (Q. 32) how PLATO fits into course goals; (Q. 33) incentives for doing well with PLATO; and (Q. 34) procedures for getting help on PLATO. The most commonly explained issues will be discussed first.

Across all of the categories, the averages of all possible ratings are fairly similar, ranging from 4.1 to 3.5 on a scale of 1 to 6. The patterns across categories were not strikingly different, either, including fairly even distribution of answers across the time choices: approximately one-third were performed frequently, occasionally, and seldom.

The highest overall average came from respondents who said that they explained procedures for getting help with PLATO Elementary (4.1); these explanations were most likely to be given daily or almost daily (43%). Furthermore, only 12% said that they never gave such an explanation. These responses indicate some level of concern or problem that would motivate relatively consistent behavior.

The twin issue of importance for teachers was describing learning objectives to students (3.7). Explanations were given daily or almost daily by almost half of the respondents (45%). This is logical in light of the program being tightly focus on specific learning objectives. In regular classrooms, this might not be so high.

Approximately one out of three respondents gave "daily or almost daily" instructions for the remaining categories.

Figure 15. Frequency of PLATO Activities

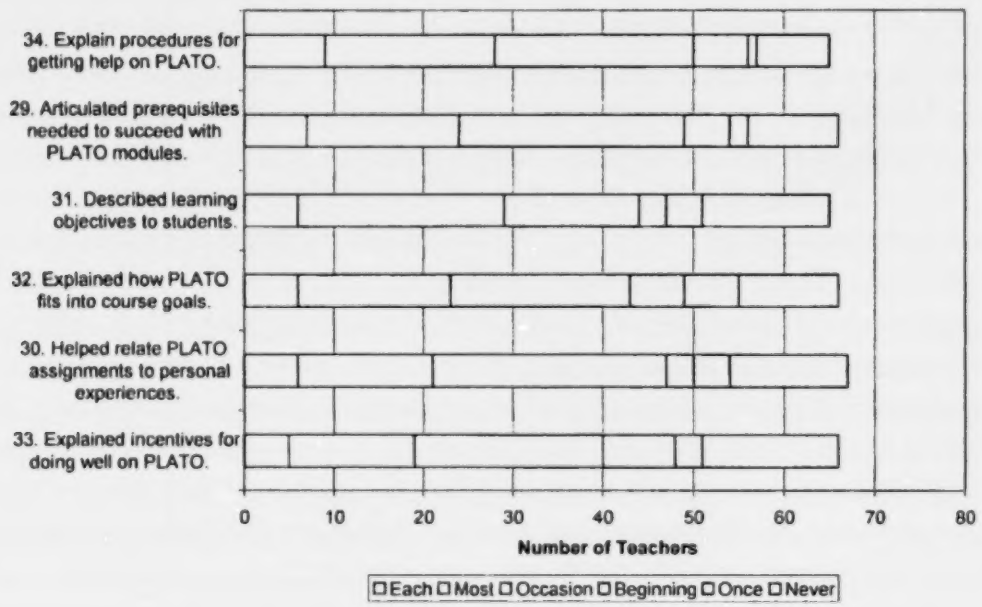

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Figure 16. Mean of PLATO Activities

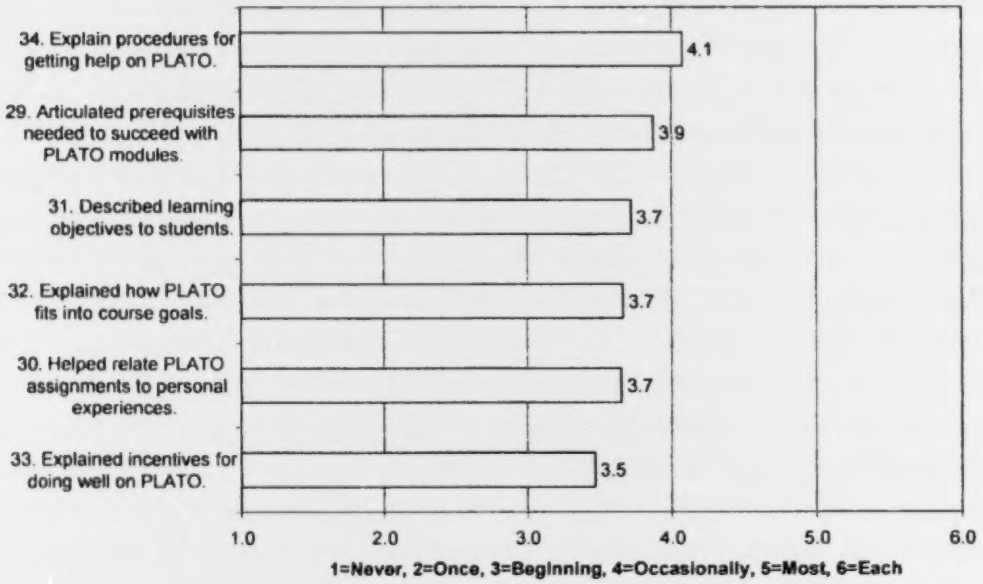
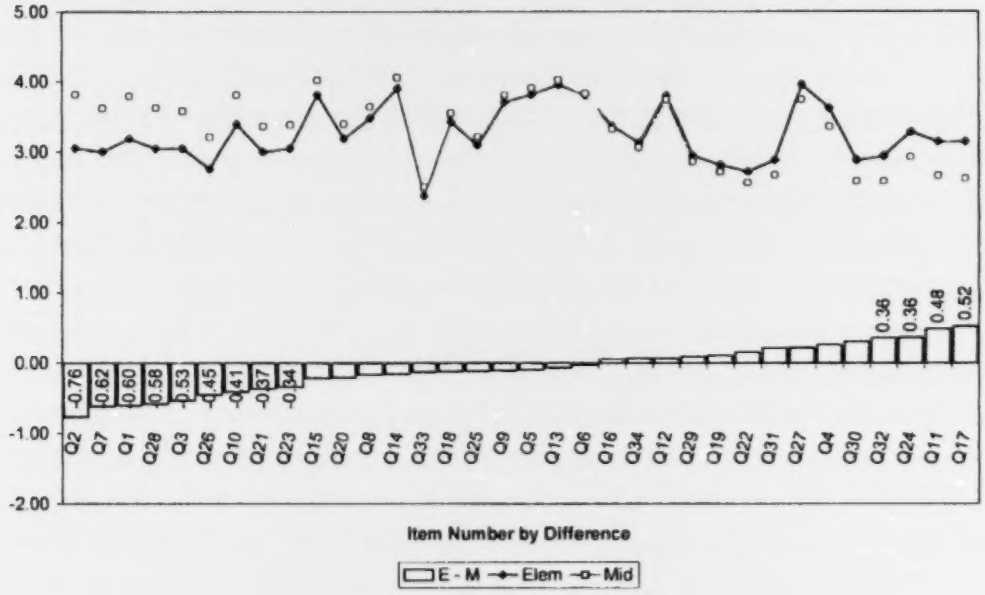


Figure 17. Mean Elementary & Middle School Teacher Responses



Open-Ended Questions. Instructors were asked seven questions at the end of the survey, with space provided for their written responses. Responses were tabulated and

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collapsed into general categories for a condensed view of issues that teachers mentioned. The categories that were generated and the numbers of teachers referring to them appear below. The total number of responses for each question does not indicate the number of respondents; some responses addressed more than one issue. (Responses were transcribed and are presented in the appendix.)

1. *What do you like **best** about teaching with the PLATO computer?*

A majority of teachers wrote that what they liked best about PLATO Elementary was that it was motivating, great for application and practice, self-paced, and a different way to reach learners.

Motivating to students, interesting	11
Great for application/practice	10
Self-paced	9
Different way to reach learners	8
Codes; alignment with proficiencies	4
Student reports; ability to track	4
Good for diagnosis and remediation	3
Good for reviews	3
Don't like it	11
Don't use; my subject not included	4
Hard to use, not enough time/help	6
Haven't used	1

2. *What do you like **least** about teaching with the PLATO computer?*

Technical problems were most frequently mentioned by respondents as being what they liked least. Student difficulty and the time required to use the program, taken together, were also notable.

Technical Problems	26
Content Issues	13
Access[3]	12
Student Difficulty	12
Time Consuming	11

3. *Was there a regular time within the sequence of a lesson or unit in which your students experienced their PLATO activities?...*

Activity, Application, Practice	19

[3] Given the student:computer ratio at Apache Junction, this is probably best interpreted as related to a need for further training in how to integrate computers into daily classroom activities, rather than as a need for more hardware. PLATO Elementary software is designed to support a wide range of learning activities with a range of student:computer ratios.

Time, misc.	10
Review	7
Complete Lesson	6
Assessment	4
No	5

4. *Describe any strategies you employed to determine whether or not the PLATO activities assigned to each student were the most appropriate for ensuring their success in your class.*

The largest category of answers, all from middle school teachers, said that trying lessons themseives was their best way of determining whether activities were appropriate. A sprinkling of middle school instructors (10) listed several other options. Nine elementary staff comments were: checking codes (3), monitoring outcomes (2), the use of peers (2), and using a recommended program (1), and three said that they were confused and did not have a strategy.

Tried them myself	15
Codes	5
Monitored outcomes	4
Helped, asked students	4
Use of peers	2
Used recommended program	1
Asked Students	1
None, confused	3

5. *How would you change the PLATO Elementary lessons?*

Two elementary teachers said they would build in assessments or codes for necessary pre-requisite skills for each lesson; sometimes students do not have all of the entry skills to do the lessons, even though they do have some. One middle school instructor suggested making a PLATO course to explain how to use the system; three others suggested making the program easier to use. The "telephone" was mentioned in particular by one teacher as being something her students had trouble with.

Add to, improve content	9
Good as they are	8
More direct, objective-specific, mature	6
Easier to work with	4
Greater computer access	2
Not on Internet	1
Want to use AA also	1

In phone interviews, teachers said the following:

"It would be nice if the content were a little more specific for the students I teach. Some of the programs are too far advanced, too hard for my students; some of the modules are too simple. The program needs more content this is specifically tied to my grade level [1st grade]. "

"In the math program, in the lessons on decimals and fractions, the program does not give a star for completed lessons when the student has done problems correctly. She said the company is fixing it."

'I like how it talks to them."

"Improve the log in. I understand the PLATO program, but it asks for day-month-year, backwards from what we usually do in this country. It asks for certain parts of the [child's] name. Kids get lost, it is too long and complicated. A simple number would be best. As it is now, they log in from the desktop, then click on the PLATO two times. It is easier to do it myself. I have trained two kids to do it. One is a student who was retained; it is good for that student."

6. *What suggestions do you have to improve the way you use the PLATO Elementary system?*

Working computers	8
Provide more time	2
Learn to use it more	2
Align PLATO Elementary with class	1
Delete old assignments	1
None	1
Miscellaneous	5

7. *What other comments or suggestions do you have on the PLATO Elementary system or this course?*

There were few comments on this last item. Of the responses, most regarded students having difficulty with content in some way and needing an easier way to use the program, particularly logging in and out.

Student problems with content	7
Easier use, incl. log-in and –out	6
Technical problems, incl. access	5
More, better training; practice	4
Access to working computers	3
Like program, training	4
Don't like program	1

The following few comments gave particular detail of potential interest:

"When assigning lessons by the curriculum codes, sometimes the PLATO Elementary activities did not match up complete with the objective. For example, the 'setting' of a story has only one question on the setting, but a whole activity on writing a script for TV."

"Quality—No good in language arts; consistent—yes, but not good."

"Kids I see are generally guessing on answers—not thinking about them. It becomes a 'guessing game' and I'm not sure how well they're using their time. I have more one-on-one time with them because I work with just PLATO kids. In order for the projects to really be effective I stay right with them. [She works in the library.]"

"Are there lessons for intermediate kids that are at a lower reading level? Most intermediate objectives have grade-level vocabulary which my lower kids can't read independently."

One respondent said, "I tried to use the computers with these students, but ran into repeated problems getting them logged on because they were not DSMS students. Prior to summer school all the 5th grade names were added to the DSMS list. The trouble occurred when trying to get them logged on. They were still listed at their other school. Our tech support person spent many hours working on the problem. My groups used PLATO when they could get on. The program was a good resource for reinforcement when it was working. Program difficulties included: Shockwave, running clock, files not found, deleted icons, etc."

"We attempted to use [PLATO Elementary and PLATO Secondary] to help us teach and reinforce the concepts taught but ran into much difficulty there. We had trouble with Shockwave, files not found, hour glass problems and log on problems, to name a few. The technology group worked with us and we whittled our way through some of the major problems. Because of the technological difficulties, we were forced to rely on traditional teaching methods for the most part. I was able to use the CPS program the last couple of days for some trivia games, just to get the students' reaction to using the transformers. This was very successful and positively received by the students."

One written comment referred to middle school students hiding the icons and exiting improperly, he thought, on purpose. "The administration was very supportive and those students who were excessively tardy or missed 3 days of instruction were removed. There were literally no behavior problems that were not handled swiftly and fairly."

Conclusions & Discussion

Selection of PLATO—PLATO Elementary was chosen because it received the highest number of points on their committee's evaluation and because it was lowest in cost. An important issue in the evaluation was its service orientation in these areas: (1) the

instructional design, which emphasizes interdisciplinary, high-level thinking skills (2) the sales representative, and (3) the support system once the program was in place.

Teacher Training—Three out of four teachers who responded said that their training was adequate. Nevertheless, it was found that in spite of providing 4-12 hours of training to every teacher[4], training does not appear to be completely effective, since teachers do not spend much time training their peers in such roll-outs. In addition, various comments and ratings alluded to difficulty in using the system. One-half of these teachers said that they were interested in further training.

Motivation in Seeking Software—State standards and criterion-referenced tests are driving instruction in this state (and others). The major goal for educators is satisfying these requirements. Instructional time is an underlying element of success, and interventions that are time-consuming in or out of class can cause a great deal of frustration. As never before, teachers are interested not only in ease of use, but also in seamless, straight-forward programs that help them be efficient.

Student Use and Test Results—The preliminary finding in this evaluation is that participation in the summer school program, including participation in the PLATO Elementary program, was positively correlated with higher student achievement. An analysis of pretest-posttest scores in the third grade summer school class showed a significant and large change in both reading and mathematics achievement. Additional analysis for first grade, second grade, and fourth grade classes showed a generally positive correlation between the level of PLATO Elementary program use and posttest student achievement scores. Given the limited sample size, this finding will need to be replicated and extended through other studies.

Use of PLATO Elementary—Most teachers did not use PLATO Elementary as their major means of instruction; rather, they used it for application, practice, or review. Those who liked the program (43%) saw this as a great need and valued its use in that role, in spite of its difficulties. Those who did not like it had special issues with the following concerns:

a. Teachers trust their own explanations and methods more than software.
b. Low-achieving children (in first grade, particularly) are language, experience, and vocabulary deficient and may not be ready for grade level instruction. Also, they may have a mixture of abilities, such as adequate reading abilities and deficient math abilities, such that a lesson is difficult to master.
c. Content did not align with state and local standards.
d. Some content was unequally addressed. Some of the objectives teachers wanted to teach were given light coverage in the PLATO Elementary modules, while other less important matters were covered at length.

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[4] Some teachers reported that only one teacher per grade was trained. Since this is at variance with the facts, there may be a perception issue surrounding training.

Strengths of PLATO Elementary—The program was appreciated for its presentation quality and consistency. Teachers also liked the variety the software offered to the overall program and the additional student practice.

Problems with Using PLATO Elementary—Below are the major issues that were represented throughout the data.

a. Computer access, especially in light of district demands for amount of student computer use requirements, was a major cause of much of the frustration that educators have experienced throughout the two years they have used it. The district's success cannot be total when computer setups produce complex classroom management arrangements. Frustrations over high demands in the face of lack of opportunity no doubt colored the entire experience for many teachers.
b. Bugs and software glitches were a major problem for half of the respondents. As one teacher wrote, "I think overall, the kids benefit from the program. It is just that sometimes technology doesn't always work for us."
c. Getting into the program, navigating through it, and exiting were great problems for many students. Perhaps these problems were exacerbated by the remedial status of the students, but these comments seemed to apply to teacher experience in general.[5]

Student Experience—It seems from the data that there is little extrinsic encouragement for students in some classrooms for using PLATO. Rewards should be built into the program by way of outstanding ease-of-use and frequency of positive feedback.

Overall, it seems that equipment availability limits the effective use of any software. The particular problems PLATO Elementary has presented, however, make it apparent that changes must be made if the program is to develop a track record of offering true advantages in the classroom.

[5] It seems likely that these issues are related to a combination of interface design in the management system, and administrative procedures for registering students. Since the time period of this study, the PLATO Primary courseware has been incorporated under a different management system, *PLATO Pathways,* which is used for all PLATO courseware. *–ed.*

Appendix: Teacher Survey Written Responses

The following section presents the responses to open-ended items in Part III of the Instructor's PLATO Evaluation. In general, answers were transcribed as they appeared. However, for greater ease in reading, spelling was corrected and in a few instances one word was added that apparently had been omitted in error. (Brackets were not used for these added words in order to facilitate ease of reading.) The responses below are labeled with the number assigned to the returned survey; skipped numbers indicate that respondents had not answered those items.

1. *What do you like best about teaching with the PLATO Elementary computer?*

MIDDLE SCHOOL #1

01 I like that I have a different way to try to reach all my learners more effectively.
02 I don't like it.
03 I don't use it because I teach computer apps.
04 The student reports.
05 The ability to track student progress.
06 It is self-motivating for the students. It covers a lot of material and is great for applying skills learned in class.
07 Haven't used long enough to know yet.
08 I do not like using PLATO Elementary.
09 In language I find that using PLATO Elementary was more difficult. Our skills in language focus mainly on writing. I do a lot of my grammar lessons with writing assignments. I then do my lessons.
10 I don't use it because of the subject I teach.
11 It is too confusing to use and we do not have complete labs or teachers in the lab to help students.
12 The students already know how to use them from elementary school.
13 I prefer to use PLATO! Easier to use.
14 Do not enjoy using PLATO Elementary. Not American history; reading is elementary.
16 The interaction of computers and students—it is a nice change of pace from just classroom settings.
17 It gives me another tool.
18 Self-paced for every student; great reports.

MIDDLE SCHOOL #2
Veteran Teachers
19 Diagnose and remediate.
20 Assists students who need additional help.
22 Kids work.
23 The codes corresponding.
24 Reinforces basic math skills.

25 Specific to Aims codes.
26 Interesting activities.
27 Does not correspond or supplement band instruction.
28 Extra set of hands.
29 Students who are completed or are behind can use PLATO Elementary to either move on or catch up.
30 Nothing.
31 Individualized practice.
32 Challenging higher students while offering tutorials for lower students.
33 I didn't. For English (which I taught the previous two years) PLATO Elementary was unclear for the students and did not provide user-friendly tutorials. In fact, PLATO Elementary is confusing to students. I used PLATO only for English as a result.
34 Students work at own pace.
36 The connection to proficiencies.
37 It gives students a break from the lecture method of teaching.
38 Knowing that my students are learning in a more "well rounded" fashion.
39 Good for reviewing prior content.

New Teachers

40 It adds to instruction.
41 It meets the needs of students.
42 I can individualize instruction.
43 Interactive and interesting for the students. Self-directed learning.
44 I am able to provide and monitor feedback to the individual students who need it the most.
46 Not much right now—I'm still confused and feel like I just throw an assignment at the kids. They do not have adequate time.
47 Have not taught with PLATO Elementary yet.
48 The fact it is a good tool for review.
49 I don't know—I just received first training session yesterday.

ELEMENTARY SCHOOL

50 Starting to be matched to state standards. The actual PLATO Elementary program is great!
51 I like the additional chance to practice reading and math concepts.
52 The children are learning and having fun doing it.
new53 Another way of teaching.
54 Kids are motivated.
55 This is a great way to review skills and practice.
56 It's very motivating for the students.
57 Reinforces skills.
59 Another way to practice.
61 At this point I find it frustrating!
62 It's another way of teaching and more time on task.
63 The students are able to work with it independently.
64 I like how we can reinforce our teachings with PLATO Elementary.
65 It gives students extra time to work on skills.

66 Individualized instruction for children.
70 Reinforce basic skills.

2. *What do you like least about teaching with the PLATO Elementary computer?*

MIDDLE SCHOOL #1

01 Last year it was down a lot. I was frustrated quite often. Students would delete the icon and I didn't know how to get it back right then and there. I would have to put a ticket in and wait. [Note on Question 27, Part I.]: The PLATO Elementary system was down for most of my training.
02 My students were confused. I didn't feel like it matched my objectives in the classroom.
05 Minor glitches.
06 It is often inaccessible. I can't find adequate **time** to allow students on the computers.
08 I feel it is confusing to the students. Each of my students have expressed how easy it is, and that they have not learned from it.
09 I don't teach like that. I'm not as comfortable using tutorial.
11 Hard to schedule; too time consuming; uninspiring.
12 The wait when they log off wrong.
14 Students find it too easy or too confusing—no in between. Irrelevant.
16 Sometimes computers aren't working right.
17 Problems with computers—and getting access to computers. Note—I'm trying to use it in both social studies and reading. I'm having some problems.
18 Has proved unreliable.

MIDDLE SCHOOL #2

Veteran Teachers
19 At times system is quirky in setting up assignments.
20 It is too easy for a student to log off improperly and then be locked out for the day. Moving through some of the assignments was confusing.
22 Computer problems.
23 I prefer less "fluff".
24 Shockwave made it impossible to use PLATO Elementary for the first two weeks of school.
25 Computer problems.
26 The integrated activities don't allow my students to focus on specific skills.
29 A lot of students have too many problems. Some codes are missing.
30 Not enough computers. Computers freeze up. Not enough time to view assignments myself to explain them. Too difficult to group and do class instruction.
31 Computers freeze up.
32 (1) Freezing screens. (2) Changing from activities after completing is confusing for students—stop, menu.
33 The fact that I had PLATO as an alternate tool. PLATO Elementary is very weak in its English section.

34 Time spent waiting for screens. Lack of direction for kids' understanding. Icons.
35 Takes up too much of my time. Many students just not motivated to work alone—especially low readers.
36 Shockwave and technological errors.
37 Not convinced it is the ideal way to support my science class.
38 Confusion and glitches.
39 Computer glitches.

New Teachers

40 A lot of teacher management.
42 Many of the objectives I need to teach only have one small lesson.
43 Benefits my students.
44 When the program of other technical problems become a distraction or obstacle, especially with large class sizes.
46 The kids know more than I do. I'm frustrated and am having trouble with reports.
47 Have not taught with PLATO Elementary yet.
48 The time it takes to schedule time.
49 Does not work consistently—electrical problems—error messages consistently.

ELEMENTARY SCHOOL

50 System bumps students out—students are not able to work independently for a set amount of time.
51 The difficulty of children logging on (not enough assistance during the children's computer time). The computers freezing up.
52 PLATO ELEMENTARY is wonderful. However, the children are either locked out of the system (we have to continually put tickets in for system problems), or the system is down.
53 Computer freezing up (building problem).
54 A child may be on a certain reading level, but the math is too difficult (on projects).
55 It takes me a lot of time to assign assignments.
56 The bugs.—It's difficult to manage kids on computers plus the others in the room. The kids on computers often need much more attention.
57 Not having time to work with the students—a lab would provide this.
58 Teachers need more time...[See number 7]
59 System bugs and down time.
60 Not enough TIME. Not enough computers.
61 [Written on Part I question #19, My students were scheduled...as much time...as needed]: Not enough computers.
62 Not always available—Freezes and shuts down in the middle of programs.
63 Much of the vocabulary is difficult for intermediate special education students.
64 Not enough time or computers.
66 The "power" issue at our school; we cannot get students on for enough time each week.
68 [Written on Part I question #24, I find working with the computer is generally a productive, rather than frustrating, experience.] Time.
70 Not enough TIME.

3. *Was there a regular time within the sequence of a lesson or unit in which your students experienced their PLATO Elementary activities?...*

MIDDLE SCHOOL #1

01 I used it to enhance a unit. For example: the Persuasive Writing unit for Language. I used it for application for math.
02 No.
05 I use PLATO Elementary to teach a complete lesson once a week.
06 Practice, review, application, and assessment.
08 I do not use PLATO Elementary to teach my class. If there is time left when they are finished with their assignment, they can get on.
09 It was used as an assessment. If they had a problem then we discussed it. I used mainly in activity period.
12 Practice and review.
16 We will use it during the activity.
17 I use it for research and current events—periodically—each quarter.

MIDDLE SCHOOL #2
Veteran Teachers
19 They use PLATO Elementary for all of the above mentioned areas.
21 Labs.
23 Assessment tool.
24 Used during mindset, after lecture.
25 An assessment tool.
26 I use PLATO Elementary mainly for application once the concepts are learned.
29 Used during the practice/review.
31 They used only for practice and review.
32 Activity/information phase in the class, not lab.
33 Yes—We visited the lab for 30-40 minutes every Thursday in each one of my classes.
34 PLATO Elementary was used after a pre-test, then students were given assignments in weak areas.
35 Various times.
36 Not this year; computers not available.
37 No.
38 Students used PLATO Elementary at various times during the unit.
39 Review only at algebra level.
New Teachers
40 During mindset.
42 Yes, I use PLATO Elementary for practice.
43 Activity phase.
44 Visited during introduction, activity, practice, review and assessment.

46 Students were assigned to the library of computer lab. I tried grouping students according to Test Item Bank results.
48 Try to get groups of kids on PLATO Elementary beginning and ending of class.

ELEMENTARY SCHOOL #1

50 I am just trying to get students to be able to log on and log off and follow the directions at this point. (No computer lab available.)
51 The children rotate once a week to work on the computer for 30 min. (Sometimes they occasionally work on it in the afternoon.)
52 My students use PLATO Elementary during the reading block for one of their centers. It is used for practice and reinforcement of skills.
54 Mostly during the practice, review, or transfer (application) phase? What I'm seeing is that it is used as a "center" without prior explanation or connection.
55 Practice, review, and application phase.
56 Students regularly use during reading and math.
57 PLATO Elementary is used as reinforcement.
58 DVES [*]—Computer lab on a weekly basis.
60 What lab.
63 After regular lessons are done.
64 It varies.
70 No.

4. *Describe any strategies you employed to determine whether or not the PLATO Elementary activities assigned to each student were the most appropriate for ensuring their success in your class.*

MIDDLE SCHOOL #1

01 I tried doing some of the activities myself. I would sit by students and help if needed.
05 I weave lessons from text and PLATO Elementary together and evaluate the mix.
06 I monitored and discussed with them what they liked or disliked.
08 I assigned them to myself and checked it out.
11 I use PLATO.
16 I worked the lesson as a student.
17 Still working on that.

MIDDLE SCHOOL #2
Veteran Teachers
20 I previewed the assignments.
23 Checking and aligning codes.
24 Match the proficiency codes.
25 Relate PLATO Elementary to mastery or not from test item bank.

26 I viewed them myself.
31 Viewing them.
33 We talked about how we applied the information in class, to the assignments. PLATO Elementary constantly froze up, made them repeat assignments they had completed, etc.
34 Preview them myself.
35 Instruction—follow in class.
37 Went through them myself.
39 Pulling assessments—retesting after completion of PLATO Elementary.
New Teachers
40 Looked at them first.
42 I preview each assignment.
43 Preview.
44 I review every assignment before they are required to start or complete it.
46 None—I'm still confused.
48 Tried to preview before assigning but difficult to manage time.

ELEMENTARY SCHOOL #1

51 I used the PLATO Elementary programs that were recommended at the inservices.
52 I'm confused about the success of my students on PLATO Elementary because the report indicated that one student was on PLATO Elementary for 20 seconds and his score was 100%. How can that be?
54 I see a lot of students who are not placed at their instructional levels or application levels.
55 Monitored if extra practice improved ability on a particular skill.
57 Use the standards.
60 Use of peers.
62 I matched them to the proficiencies and to their own level.
63 Whether activities matched the objectives on their IEPs [Individual education plans].
64 Pre-testing and scoring reports.
70 Peer tutoring.

5. ***How would you change the PLATO Elementary lessons?***

MIDDLE SCHOOL #1

01 Maybe make the PLATO Elementary Units apply to a whole curriculum unit. Now you have to click on parts of a PLATO Elementary unit for the appropriate codes.
02 Make them less elementary.
03 I wouldn't, they are great.
08 I'm not sure if you could create a computer based lesson that would do what I need it to do in Language Arts.
09 I wouldn't. It works for most students.
11 Be more direct.

16 I wouldn't.
17 More U.S. history software.
18 Update them.

MIDDLE SCHOOL #2

Veteran Teachers
19 Add real and relevant social studies lessons tied to state standards
20 They need to be more challenging.
25 Not on Internet.
26 I wouldn't, but I would be more lenient about using PLATO as a substitute until the concepts are learned.
27 Add some music specific—maybe theory, history, ear training—topics.
28 I need more computer time for my classes.
30 Design a PLATO Elementary "class" for new students and sixth graders and low kids.
33 Kids are confused by the phone. They're unclear on how to use it. I think they don't value it or its use.
34 Lessons are OK.
36 Nothing.
37 Increase physical science concepts—chemistry and physics.
New Teachers
40 More objective-specific.
41 More lessons on the objectives.
43 Make them a bit longer (each lesson only lasts about 15 minutes).
44 I would not make any changes at this time.
48 Make them easier to work with and understand. Easier to go through program.

ELEMENTARY SCHOOL

50 I would have the (show-next) icons blink when ready. Kids who can't read are expected to read those buttons, too.
54 If the lessons were designed with the sub-skills broken out before so students could review. (For example, in the "Yellowstone connections" project, kids need to know bar graphics and how to multiply, e.g., numbers with zeros.)
57 Not enough objectives. Need teacher time.
63 More pre/post tests to see whether student needs or has skills in the lessons.
64 I would make sure all of the codes match and all district codes were offered. [From comments written on Part I question #4: Content seemed generally free of errors and inaccuracies.] Codes are sometimes mismatched and program is slow.
70 More time blocks.

6. *What suggestions do you have to improve the way you use the PLATO Elementary system?*

MIDDLE SCHOOL #1

01 Have more computers available that work.
03 Separate it from Internet Explorer. Make it a stand alone system.
06 When every computer WORKS (which is not very often), all is well!
08 I don't think I need to improve on the way I use PLATO Elementary. I feel I am the teacher, and this should just be used as a reinforcement tool, not a way of teaching.
09 I could learn to use it more in reading and language.
11 I suggest we do not use a system that is "cold" and complicated and requires computers we do not have!

MIDDLE SCHOOL #2
Veteran Teachers
20 Gain more knowledge of the system.
25 Delete old assignments.
29 Allow more time for the students.
31 More whole class use—labs.
33 I would rather not use the system for Language Arts. Perhaps social studies will be easier for kids to understand and use.
34 Less icons—a tutorial lesson on just how students use the system—they go in without knowing how to navigate.
39 Need more computers—tough to get all 35 on throughout week.
New Teachers
43 Reduce technical problems.
44 I would like to have computers in my room so I can apply the PLATO Elementary system more effectively on a more consistent basics.
48 None—first year—just trying to survive.

ELEMENTARY SCHOOL

50 Improve the computers themselves.
54 Tying to lessons they're doing in regular class. More discussion beforehand. Higher order thinking skills for the kids (train them).
58 Teachers need more time to assign lessons, assess reports, and utilize the program to the best of our advantage.
60 Not enough time in the day to use.
64 I would make sure all of the codes match and all district codes were offered.

7. *What other comments or suggestions do you have on the PLATO Elementary system or this course?*

MIDDLE SCHOOL #1

01 I am happy that PLATO Elementary has a new server. I am ready to try it again this year with my students. [On front page]: When assigning lessons by the curriculum codes, sometimes the PLATO Elementary activities did not match up complete with the objective. For example, the "setting" of a story has only one question on the setting, but a whole activity on writing a script for TV
06 It just seems that something could be done to increase the reliability factor—program=accessible; computers=operable
08 I feel the students should have a voice when this is concerned. Ask them how much they actually understand or learn from PLATO Elementary.
10 Have more subjects! Even items for ESL.
11 We need to consider the topic of access—I have classes of 33-36 and it is hard to schedule into a lab that has enough computers working.
14 Don't like to use PLATO Elementary—prefer PLATO.

MIDDLE SCHOOL #2

Veteran Teachers
19 Could be more user friendly.
20 There needs to be more of a connection between student interests and the assignments.
22 Better training.
24 It's OK.
31 Have the kids go through the training.
32 Many students had difficulties determining what was being asked by the question, which frustrated them.
33 [Trainer] needs to be a little more patient in his presentations. He is very short and rude. We're adults. Treat us as such. [From comments written on Part I question #6—Quality and style of instruction was consistent throughout the curriculum.]: Quality—No good in language arts; consistent—yes, but not good.
34 Technology questions.
35 [From comments written on Part I question #17—I was able to spend time in one-on-one tutoring…] Too much time trouble-shooting software.
[From comments written on Part I question #24—I find working with the computer is generally a productive, rather than frustrating, experience.]: Once bugs are ironed out on PLATO Elementary, this may be the case.
37 Increase physical science concepts.
New Teachers
40 Easier. Less time-consuming. Computer does work for you.
44 I think it is a great tool that enhances the teaching/learning experience.
46 Give me more training—I need help in lessons, reports, and time management.
48 Get bugs out so program runs smoothly consistently. Have all plug-ins loaded and ready to go.
49 This class was very informative. Thanks for your help! Item 23: [My students] voice concern of it being childish.

ELEMENTARY SCHOOL

50 We all just need more practice!!

52 [Added on other items]: Students cannot understand log out directions.

54 Kids I see are generally guessing on answers—not thinking about them. It becomes a "guessing game" and I'm not sure how well they're using their time. I have more one-on-one time with them because I work with <u>just</u> PLATO Elementary kids. In order for the projects to really be effective I stay right with them. [She works in the library.]

56 Are there lessons for intermediate kids that are at a lower reading level? Most intermediate objectives have grade-level vocabulary which my lower kids can't read independently.

57 Make logins easier for primary.

58 [From comments written on Part I question #23: [Students] were bored by Christmas.

61 [From comments written on Part II question #33: Clearly identified to students rewards and incentives…] All they got was a point!

64 We need to have more time to have students on; lessons take awhile.

70 Less trouble-shooting.

About the Authors

David W. Quinn is currently working as an independent evaluator specializing in evaluating technology use for learning and teaching. He received a doctorate in educational evaluation from Western Michigan University in 1978. He recently completed ten years at the North Central Regional Educational Laboratory as a Senior Program Associate where he managed the evaluation unit and evaluated technology use in many setting. He has evaluated technology use for the states of Indiana and Virginia, and for school districts in Chicago, Miami-Dade, and Los Angeles County. Before NCREL, Dr. Quinn had conducted numerous evaluation studies for clients in K-12, university, not-for-profit social services, and for-profit training companies. For ten years he was on the faculty in the Department of Instructional Science, Brigham Young University, where he taught graduate research methods courses. He is the author of journal articles and book chapters evaluating technology use in education.

Nancy W. Quinn is an evaluator and instructional designer. She received a masters in Instructional Technology from Brigham Young University in 1991. She recently completed studies of statewide beginning literacy programs in three Midwestern states. She has evaluated the use of technology as a research tool in a research library. She has also evaluated the use of technology by fourth, fifth, and sixth graders in four-year at-school and at-home program.

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